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Fuess[9] has perfected an attachment for the microscope which enables an observer to enclose with a diamond scratch any given spot in a thin section, so that it may be easily identified for further study.

Marsters[10] describes two camptonite dykes cutting white crystalline limestones near Danbyborough, Vt. They differ from the typical camptonite in being much more feldspathic than the latter rock. They moreover, contain but one generation of hornblende, corresponding to the second generation in the typical rock, and but few well developed augite phenocrysts, although this mineral is found in two generations.

A portion of Mte. S. Angelo in Lipari consists of a porous yellowish pyroxeneandesite containing grains and partially fused crystals of cordierite, red garnets and dark green spinel.[11]

Cole[12] declares that the "hullite" described by Hardman as an isotropic mineral occurring in the glassy basalts of Co. Antrim, Ireland, is in reality an altered portion of the rock's groundmass, and is no definite mineral substance.

The same author[13] describes the old volcanoes of Tardree in Co. Antrim as having produced rhyolitic lavas instead of trachytic ones as has generally been stated.

GEOLOGY AND PALEONTOLOGY.

On the Species of Hoplophoneus.—Four species of *Hoplophoneus* have already been described; *H. cerebralis* Cope, *H. oreodontis* Cope, *H. primaevus* Leidy and Owen, *H. occidentalis* Leidy. *Dinotomius atrox* will be shown to be a synonym of the latter species. To these may be added *H. robustus* and *H. insolens* herein described. The following key may be valuable in determining the species from a few characters.

A. Skull small, occiput nearly vertical.
  a. Superior sectorial with large anterior basal cusp.
    1. Pms. $\frac{2}{}$ *H. cerebralis* John Day.
  b. Superior sectorial with incipient anterior basal cusp.

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[9] Neues Jahrb. f. Min., etc., 1895, I, p. 280.

[10] Amer. Geol., June, 1295, p. 368.

[11] Bergeat: Neues Jahrb. f. Min., etc., 1895, II, p. 148.

[12] Belfast Nat. Field Club Proceedings, 1894–5.

[13] Geol. Magazine, No. 373, p. 303.

2. Pms. $\frac{3-2}{2}$ pm. 2 reduced or absent *H. oreodontis* White River.
3. Pms. $\frac{3}{2}$ *H. primaevus* White River.

B. Skull large, occiput overhanging.
Superior sectorial with incipient anterior basal cusp.

4. Pms. $\frac{3-2}{2}$ pm. 2 reduced or absent *H. robustus* White River.
5. Pms. $\frac{2}{2}$ *H. insolens* White River.
6. Pms. $\frac{2}{2}$ inferior sectorial with no posterointernal cusp, heel reduced, *H. occidentalis* White River.

Hoplophoneus occidentalis Leidy.

In The Extinct Fauna of Dakota and Nebraska (1869) Leidy described two fragments of a mandible which he thought indicated a species larger than *Hoplophoneus primaevus* and to which he gave the name *H. occidentalis* (*Drepanodon occidentalis*), figuring the specimen in Plate V. No further material was referred to this species until 1894, when Osborn and Wortman in describing a collection of White River fossils in the Bulletin of the American Museum of Natural History determined two specimens as *H. occidentalis*, giving measurements of the more important bones of the skeleton in comparison with those of *H. primaevus.* While pursuing my studies in the American Museum through the kindness of these gentlemen, I found that a complete mandible of specimen No. 1407 from the Oreodon Beds agrees in every particular with Leidy's type, which I have had the privilege of examining in the Philadelphia Academy. A drawing of the mandible accompanied by a faithful copy of Leidy's figure is given in the accompanying plate. Associated with the mandible are several vertebrae and portions of limb bones showing the skeleton to be much larger than the specimen previously determined as *H. occidentalis* in the American Museum Bulletin. They however, agree, as does also the mandible, with *Dinotomius atrox* described by Dr. Williston in the Kansas University Quarterly, January, 1895, from a fine skull and nearly complete skeleton. This specimen which I had the pleasure of seeing last summer I now have no hesitation in referring to *H. occidentalis.* It makes possible the determination of the skeletal characters and affinities, and the restoration promised by Dr. Williston will complete our knowledge of this species. The following measurements are taken from the Kansas University Quarterly.

Length from inion to premaxillary border	260 mm.
Width of zygomata	145 "
Length of mandibular ramus	164 "

Length of humerus	240 "
Width of distal end of humerus	73 "
Length of tibia	237 "
Width of proximal end of tibia	61 "
Width of distal end of tibia	41 "

The relation of *H. occidentalis* to *Eusmilus dakotensis* Hatcher, published in the December NATURALIST, is at once apparent. By comparison with the excellent figure by Mr. Weber, republished by permission in the accompanying plate, it will be seen that *H. occidentalis* stands directly ancestral to *E. dakotensis*, the dentition agreeing very strikingly in the characters emphasized by Mr. Hatcher, but differing in showing an additional incisor and premolar and the presence of a heel on the sectorial. In *Eusmilus bidentatus* Filhol, the type of the genus, the heel is present.

Hoplophoneus insolens sp. nov.

The determination of the characters of *H. occidentalis* makes it obvious that the skeleton determined as such by Osborn and Wortman is a new species. A complete skeleton (number 11,022) and a second specimen with the most of the limb bones and a skull lacking the mandible (number 11,372), both in the Princeton Museum, enable me to determine the skull of this species, a character which is lacking in the American Museum specimen. The particularly close agreement in the size of the skeletons makes either of them typical, consequently I give the measurements already published in the American Museum Bulletin along with measurements from the Princeton specimen as indicative of the size of the species.

The skull of *H. insolens* is long and low, the postorbital constriction very marked, sagittal crest slightly concave, the occiput overhanging and concave from side to side, the posttympanic process is long and massive approaching the postglenoid process and being produced as far inferiorly. The limb bones have stout shafts and relatively small extremities.

Dentition: I ^{3}, C $\frac{1}{1}$, Pm $\frac{2}{2}$, M $\frac{1}{1}$; the second upper premolar which is variable in the genus usually being absent in this species.

Length of skull, condyles to premaxillary border .	190 mm.
Length of humerus	200 "
Length of ulna	212 "
Length of radius	160 "
Length of femur	250 "
Length of tibia	188 "
Length of pelvis	210 "

Hoplophoneus primaevus Leidy and Owen.

The original type of this species is figured in the The Ancient Fauna of Nebraska (1853). Later Leidy figured two skulls in the Extinct Fauna of Dakota and Nebraska, remarking that the larger one might be the skull of an old male, and that the original type was somewhat intermediate in size. The determination of the variation due to sexual characters seems impossible in the case of the extinct cats. However, the material which is available, shows that there are two types represented by these two skulls, the skeletons referable to the types differing more markedly than the skulls. Inasmuch as Leidy's original type agrees more closely with the smaller one, the difference being about such as is presented in any of the species of Machairodonts, it is taken as representative of *H. primaevus*. In the Princeton collection there is a fairly complete skull (number 11,013) and two nearly complete skeletons (numbers 10,741 and 10,934), with the latter skeleton there is also most of the skull. This makes it possible to correlate the skull with the skeletons and give the measurements of the species. The skull is short and high in the frontal region, the orbit horizontally oval, the posttympanic process short, the glenoid drooping considerably below it.

The skeleton is not rugose and the limb bones have slender shafts as in *Dinictis felina*. The dental formula is I $\frac{3}{3}$, C $\frac{1}{1}$, Pm $\frac{3}{2}$, M $\frac{1}{1}$; the second superior premolar probably being constantly present.

Length of skull, condyles to premaxillaries, Leidy's type (approximately)	150 mm.
Length of humerus	160 "
Length of ulna	163 "
Length of radius	122 "
Length of femur	185 "
Length of tibia	143 "

Hoplophoneus robustus sp. nov.

This species is proposed as representative of Leidy's second type of *H. primaevus*. It has its most perfect type in the skeleton and skull (No. 650) determined as *H. primaevus* by Osborn and Wortman, the measurements of which were published in the American Museum Bulletin, Vol. VI, 1894, p. 228, along with those of *H. insolens* (*H. occidentalis*) and which I give here, adding the measurement of the skull. The species is represented in the Princeton collection by specimen number 10,647, consisting of a fairly well preserved skull and mandible together with a humerus and portions of other limb bones. The skull is relatively large compared with the skeleton. The limb bones are rugose and have stout shafts, being very similar to those of *Dinictis fortis*,[1] and are thus very different from those of *H. primaevus*. Dentition : I $\frac{3}{3}$, C $\frac{1}{1}$, Pm $\frac{2\text{-}3}{2}$, M $\frac{1}{1}$.

Length of skull, condyles to premaxillary border	180 mm.
Length of humerus	170 "
Length of ulna	163 "
Length of radius	132 "
Length of femur	195 "
Length of tibia	160 "
Length of pelvis	180 "

Hoplophoneus oreodontis Cope.

This species is Cope's type of the genus. I introduce it here for the purpose of mentioning a complete skull in the Princeton Museum (number 10,515) which supplements the original type and is, therefore, used here for comparison. The approximate lengths of the femur and tibia are based upon the lengths of these bones associated with the type skull, the epiphyses being lost. Dentition : I $\frac{3}{3}$, C $\frac{1}{1}$ Pm $\frac{2\text{-}3}{2}$, M $\frac{1}{1}$.

Length of skull, condyles to premaxillary border, approximately :	135 mm.
Approximate length of femur	120 "
Approximate length of tibia	110 "

Hoplophoneus cerebralis Cope.

This species from the John Day is the smallest of the genus and at the sametime the most peculiar. Cope has pointed out its specific characters as follows: Space for the temporal muscle relatively short; brain capacity large; profile of the face very convex; sagittal crest horizontal; occiput vertical ; no paroccipital processes ; orbit vertically

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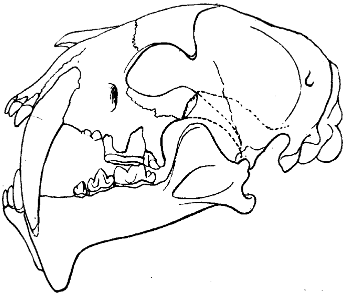
[1] In my description of *D. fortis*, American Naturalist, June, 1895, I compared the skeleton with that of *H. occidentalis*, following the description of that species as given by Wortman and Osborn, which the foregoing determination of its skeletal characters shows to be incorrect. *D. bombifrons*, which I described at that time I now find to be a synonym of *D. fortis ;* the skull described being correlated with the skeleton and portion of a skull of *D. fortis* by means of specimen number 1400 of the American Museum.

PLATE I



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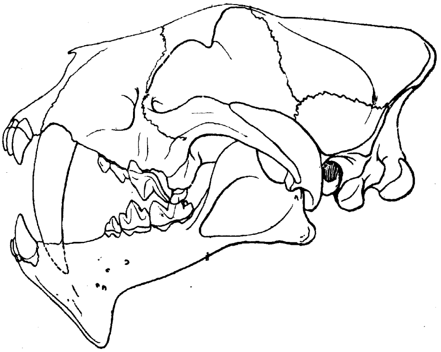

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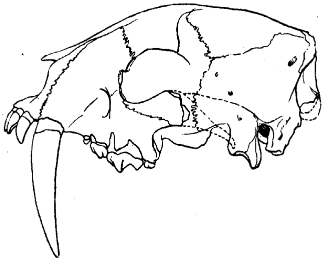

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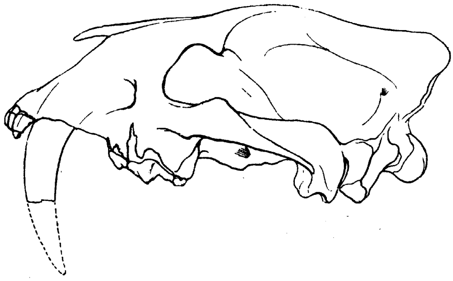

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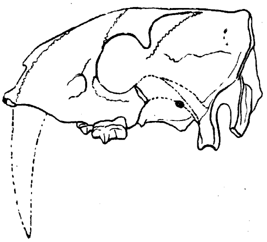

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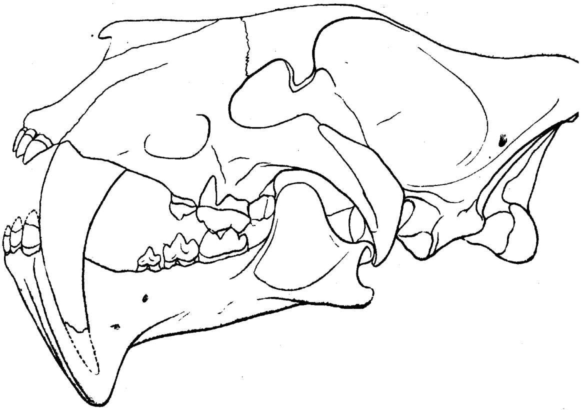

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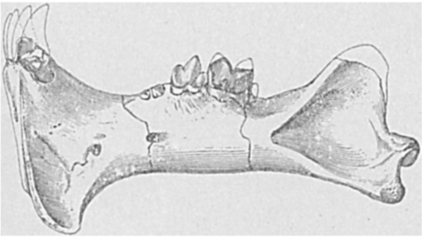
Adams on the Species of Hoplophoneus.

PLATE II.



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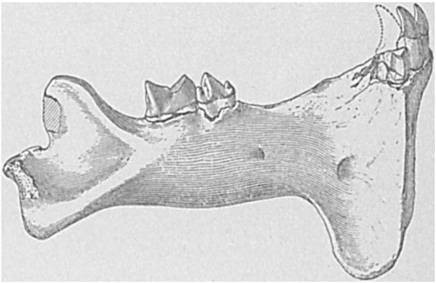

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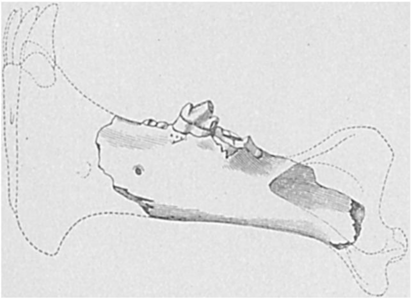

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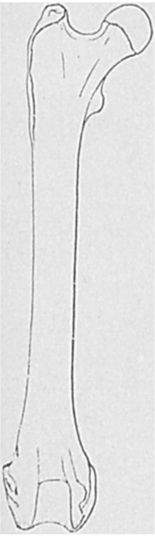

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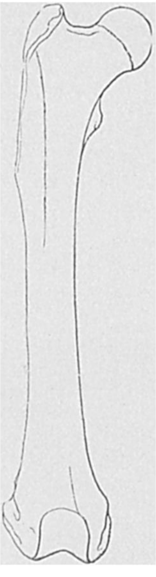

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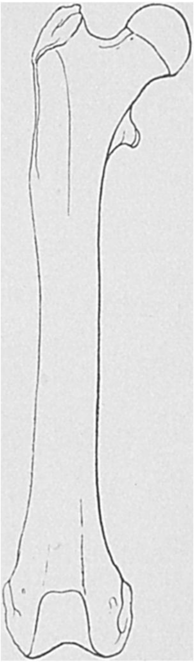

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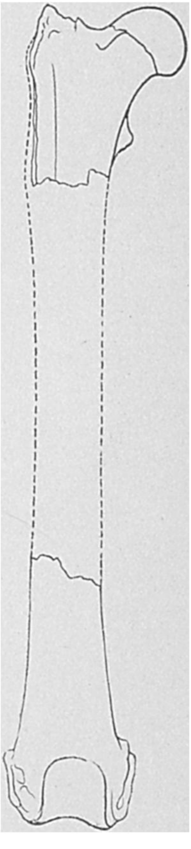

Adams on the Species of Hoplophoneus.

oval. Dentition: I $^{3}/$, C $^{1}/$, Pm $^{2}/'$, M $^{1}/$, the third premolar being much reduced.

Length of skull, condyles to premaxillary border (approximately) . . . . 120 mm.

There are thus six species of *Hoplophoneus*, disregarding *H. strigidens* Cope, which being based upon a fragment of a canine exhibiting a peculiar form, is not characterized by any features which refer it to *Hoplophoneus* rather than any other genus. With the exception of *H. cerebralis* they are all from the White River. They present an interesting series both in the size of the skulls and skeletons. The accompanying series of femora give an idea of the relative characters of the skeletons of the larger members of the genus as regards size and strength. Unfortunately nothing is known of the skeleton of *H. cerebralis*, but judging from the size of the skull it would be the smallest of the series, although probably not much smaller than that of *H. oreodontis*. In restoring the femur of *H. occidentalis* I am indebted to Dr. Williston for information as to its length.

The series of skulls figured in outline when taken in connection with the series of femora give an idea of the relative size of the species. The gradation in size is for the most part comparable with the gradation in size of the skeletons. Each species has shown, from careful comparisons and measurements of all the available material, a limited amount of variation, but in no case losing its identity when both the skull and skeleton are taken into consideration.—GEO. I. ADAMS, Fellow of Princeton College.

EXPLANATION OF PLATES.

Plate I.

Fig. 1.—Hoplophoneus cerebralis (after Cope).
Fig. 2.—Hoplophoneus oreodontis (number 10,515 Princeton Museum).
Fig. 3.—Hoplophoneus primaevus (after Leidy).
Fig. 4.—Hoplophoneus robustus (number 650 American Museum).
Fig. 5.—Hoplophoneus insolens (number 11,022 Princeton Museum).
Fig. 6.—Hoplophoneus occidentalis (after Williston).

All $\times\frac{3}{8}$

Plate II.

Fig. 1.—Hoplophoneus occidentalis (Leidy's type).
Fig. 2.—Hoplophoneus occidentalis (number 1,047 American Museum)
Fig. 3.—Eusmilus dakotensis (after Hatcher).

Fig. 4.—Hoplophoneus primaevus.
Fig. 5.—Hoplophoneus robustus.
Fig. 6.—Hoplophoneus insolens.
Fig. 7.—Hoplophoneus occidentalis.

All $\times \frac{3}{8}$

The Goldbearing Quartz of California.—The salient characteristics of the gold quartz veins of California are briefly given by Mr. Waldemar Lindgren in a paper recently published, and the results of his observations are thus summarized :

"The auriferous deposits extend through the state of California from north to south, in an irregular and unbroken line.

"The gold quartz veins occur predominantly in the metamorphic series, while the large granitic areas are nearly barren. The contact of the two formations is not distinguished by rich or frequent deposits."

"The gold quartz veins are fissure veins, largely filled by silica along open spaces, and may dip or strike in any direction.

"The gangue is quartz, with a smaller amount of calcite ; the ores are native gold and small amounts of metallic sulphides. Adjoining the veins, the wallrock is usually altered to carbonates and potassium micas by metasomatic processes.

"The veins are independent of the character of the country rock, and have been filled by ascending thermal waters charged with silica, carbonates and carbon dioxide.

"Most of the veins have been formed subsequent to the granitic intrusions which closed the Mesozoic igneous activity in the Sierra Nevada."

Regarding the origin of the gold, the author speaks with reserve. He points out the possibility of its derivation from the surrounding rocks, which theory, however, is not altogether satisfactory. He then states the following facts and the conclusion based upon them :

"First, the gold quartz veins throughout the state of California are closely connected in extent with the above described metamorphic series and that the large granite areas are almost wholly void of veins, though fissures and fractures are not absent from them.

"Second, that in the metamorphic series the gold quartz veins occur in almost any kind of rock, and that if the country rock exerts an influence on the contents of the veins, it is, at best, very slight.

"Third, that the principal contact of the metamorphic series and the granitic rocks is in no particular way distinguished by rich or frequent deposits.

"It is further apparent that gold deposits have been formed at different periods, though, by far, most abundantly in later Mesozoic times. Some of these later veins may have been locally enriched by passing through earlier impregnations in schist or old concentrations in the sandstones and conglomerates of the metamorphic series, the gold contents of which have, however, only been proved in isolated cases.

"These considerations strengthen the belief that the origin of the gold must be sought below the rocks which now make up the surface of the Sierra Nevada, possibly in granitic masses underlying the metamorphic series." (Bull. Geol. Soc. Am., Vol. 6, 1895.)

Precambrian Sponges.—M. L. Cayeux has published a preliminary note on the spicules of sponges found in the Precambrian beds of Bretagne. The author describes the different forms of the spicules, gives their dimensions, the mode of fossilization, and the probable causes for their fragmentary condition. The principal conclusions derived by M. Cayeux from his researches are (1) numerous spicules of sponges of various species are found in the Precambrian phtanite formations of Bretagne, and (2) that all the orders of sponges with silicious skeletons are represented in these formations.

A resume of the facts ascertained concerning this interesting fauna is given by the author as follows:

"It is impossible not to be struck by the ensemble of the sponges of the phtanites of Lamballe. Even excluding all the spicules which, although they certainly are sponges, yet are too fragmentary for exact identification, there remains an assemblage of forms which points to a very complex fauna.

"In the light of our present knowledge this fauna appears to be composed of Monactinellidæ, probably abundant, Tetractinellidæ, relatively rare, numerous Lithistidæ, and a few Hexactinellidæ. All the orders of Silicea are represented. The branching off of the sponges is then plainly as early as the base of the Precambrian of Bretagne.

"The oldest beds in which any remains have been found belongs to the Archean of Canada. M. G. F. Matthew has described *Cyathospongia? eozoica* from the Lower Laurentian of St. John (New Brunswick) and *Halichondrites graphitiferus* from the Upper Laurentian of the same region.

"*Cyathospongia? eozoica* may be a species of Hexactinellidæ, and *Halichondrites graphitiferus* must be referred either to Monactinellidæ or to Hexactinellidæ. The authenticity of these fossil sponges has been put beyond a doubt by M. Hermann Rauff.

"All the great groups of silicious sponges do not figure in this assemblage, but the fauna presents this character worthy of note, that the Lithistidæ and the Hexactinellidæ, that is to say, the sponges which have the most complex skeleton occupy a prominent place.

"I have called attention to these Cambrian sponges to show that there is no fundamental difference between the Precambrian and the Cambrian sponge fauna. In the one as in the other, we find already traced, the lines along which the future silicious sponges are developed." (Annales Soc. Geol. du Nord T., XXIII, 1895.)

Embryology of Diplograptus.—A large collection of specimens of Graptolites found near Dolgeville, N. Y., furnishes Mr. R. Ruedeman the data for a paper on the mode of growth and development of the genus Diplograptus. The species, *D. pristis* Hall, and *D. pristiniformis* Hall, appear as compound colonial stocks instead of single stipes, as hitherto known. From his observations the writer infers that the colonial stock was carried by a large air bladder, to the underside of which was attached the funicle. The latter was enclosed in the central disc, and this was surrounded by a verticil of vesicles, the gonangia, which produced the siculæ. Below the verticil of gonangia and suspended from the funicle was the tuft of stipes.

It is evident from the structure of these graptolites that the genus Diplograptus has the combined properties of different groups, and gives valuable hints in regard to their common ancestry. The investigation of Mr. Ruedeman is one of the most important recent acquisitions of paleontologic embryology. (Am. Journ. Sci., 1895, p. 453.)

The Upper Miocene of Montredon.—M. Ch. Deperet has just published the results obtained through the excavations he has been making in the hill of Montredon near Bize (Aude), The fossils which he has collected are found also in the peat beds where they are much broken and slightly worn, and in the white marls where he has found more complete specimens, such as skulls and parts of limbs with the bones in proper relation.

Notwithstanding an abundance of fossils, the fauna of Montredon, until now, was characterized by a paucity of species, comprising only Dinotherium, Hipparion, a Rhinoceros and an undetermined Ruminant. The discoveries of M. Deperet have increased the known vertebrates to twelve. There are, in addition to the animals just mentioned, a wild boar, agreeing with *Sus major* of Leberon ; three ruminants, *Tragocerus amalthœus*, *Gazella deperdita*, and Micromeryx ; three carnivores, *Si-*

mocyon diaphorus, Dinocyon, Hyænarctus arctoides. This last constitutes, says the author, a true intermediate type between Hyænarctus of the Miocene and the bears of the Pliocene, as *Ursus arvernensis* and *Ursus etruscus.* M. Deperet adds that the discovery of this animal fills a gap by revealing in a precise manner the ancestral relation of the bear type. (Revue Scientif., 1895, p. 375.)

BOTANY.[1]

The Vienna Propositions.—(*Continued from page* 1100, *Vol. XXIX.*)—In a succeeding number of the same journal, Dr. Kuntze replies to the foregong article at some length. A considerable portion of the reply is taken up with personalities. This is not without provocation, for Ascherson and Engler have grievously misrepresented him in more than one place in the foregoing article, e. g., in the matter of his proposed 100-year limitation, and his comparison of the changes required by 1737 and 1753—as one can readily see by glancing at Revisio Generum 3[1]. Indeed, they substantially concede the injustice of their accusation as to Kuntze's statement with reference to the changes required by 1753, a few paragraphs beyond, when they discuss their proposed limitation of fifty years. The anonymous correspondent of the *Journal of Botany* who was so pained at the supposed bitterness prevailing in America, is respectfully referred to the pages of the *Oesterreiche Botanische Zeitschrift* for an example of the state of feeling in other lands.

The following extracts will give an idea of Dr. Kuntze's reply.

Of the six propositions of Ascherson and Engler he says: "Numbers 1–4 are not new; No. 5 is a *principium inhonestans,* and No. 6 a supplement to No. 5. The new principle is a year limitation proposal with retroactive force. I had previously proposed a limitation of 100 years only for names sought to be revived in the future, which would only affect old names which are mostly doubtful and undetermined, so that by my proposed limitation, the doubtful cases would be disposed of and greater stability of nomenclature brought about. By the proposition of Messrs. Ascherson and Engler on the other hand, acquired rights would be violated. The gentlemen, indeed, in their last account no longer recognize this right, even as little as the right o political legitimism. These gentlemen now reject also the law o

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[1] Edited by Prof. C. E. Bessey, University of Nebraska, Lincoln, Nebraska.